

WHAT IS CLAIMED:

- 1 1. A method for supplying an inspired gas to a person, the method
2 comprising the steps of: a) determining whether the person is in the exhalation
3 or inhalation phase of a respiratory cycle; and b) delivering an increased flow of
4 inspired gas to the person during the inhalation phase of the respiratory cycle.
- 1 2. The method of claim 1, wherein the inspired gas includes pure gas.
- 1 3. The method of claim 2, wherein the pure gas includes oxygen.
- 1 4. The method of claim 1, wherein the inspired gas includes a gas mixture.
- 1 5. The method of claim 4, wherein the gas mixture includes a mixture of
2 oxygen and air.
- 1 6. The method of claim 4, wherein the gas mixture includes a mixture of
2 oxygen and nitrogen.
- 1 7. The method of claim 4, wherein the gas mixture includes a mixture of
2 oxygen and water vapor.
- 1 8. The method of claim 4, wherein the gas mixture includes a mixture of
2 oxygen and bronchodilators.
- 1 9. The method of claim 4, wherein the gas mixture includes a mixture of
2 oxygen and helium.
- 1 10. The method of claim 1, wherein the inspired gas may be released to the
2 ambient environment.
- 1 11. The method of claim 1 also comprising the step of determining the primary
2 respiratory site; and sampling the person's breath gas stream at least in
3 accordance with the determination of the primary respiratory site.

1 12. The method of claim 11 whereby the gas stream at the mouth is
2 continuously sampled, in addition to sampling at the determined primary
3 respiratory site.

1 13. The method of claim 11, wherein the step of sampling the breath gas
2 stream includes the step of monitoring the ventilation of the person at least in
3 accordance with the determination of the person's primary respiratory site.

1 14. The method of claim 13 whereby the gas stream at the mouth is
2 continuously sampled, in addition to sampling at the determined primary
3 ventilatory site.

1 15. The method of claim 1 wherein the inspired gas is delivered to the person
2 in the area of the person's nose and mouth.

1 16. The method of claim 1, wherein the inspired gas is delivered to the person
2 in the area in front of the person's mouth.

1 17. The method of claim 1 wherein the determining of whether the person is
2 in the exhalation or inhalation phase is accomplished by analyzing the pressure
3 in the person's breath gas stream.

1 18. The method of claim 17 also comprising the step of monitoring the
2 respiratory rate in accord with the pressure analysis.

1 19. The method of claim 17 also comprising the step of monitoring the
2 inspiratory/expiratory time ratio in accord with the pressure analysis.

1 20. The method of claim 17, wherein the pressure in the person's breath gas
2 stream is determined by sampling pressure at at least one respiratory site.

1 21. The method of claim 17, wherein the determining of whether the person is
2 in the exhalation or inhalation phase is accomplished by analyzing the humidity
3 in the person's breath gas stream.

1 22. The method of claim 21 also comprising the step of monitoring the
2 respiratory rate in accord with the humidity analysis.

1 23. The method of claim 21 also comprising the step of monitoring the
2 inspiratory/expiratory time ratio in accord with the humidity analysis.

1 24. The method of claim 17, wherein the determining of whether the person is
2 in the exhalation or inhalation phase is accomplished by analyzing the
3 temperature in the person's breath gas stream.

1 25. The method of claim 24 also comprising the step of monitoring the
2 respiratory rate in accord with the temperature analysis.

1 26. The method of claim 24 also comprising the step of monitoring the
2 inspiratory/expiratory time ratio in accord with the temperature analysis.

1 27. The method of claim 11, wherein the determining of the primary
2 respiratory site is accomplished by sampling pressure at the respiratory sites
3 and comparing said pressures.

1 28. The method of claim 11, wherein the step of sampling the exhaled gas
2 stream includes sampling the level of CO₂ in the person's breath gas stream.

1 29. The method of claim 13, wherein the monitoring of the ventilation is
2 accomplished by measuring the CO₂ levels in the person's breath stream.

1 30. The method of claim 29, wherein the monitoring of the ventilation is
2 accomplished by measuring the end-tidal CO₂ value.

1 31. The method of claim 29, wherein the monitoring of the ventilation is
2 accomplished by determining the area under the expired CO₂ time pilot.

1 32. The method of claim 1 also comprising the step of delivering a decreased
2 flow of inspired gas to the patient during exhalation.

1 33. The method of claim 11, wherein the step of sampling the breath gas
2 stream includes monitoring the level of a drug in the person's breath gas stream.

1 34. The method of claim 33, wherein the drug is an intravenous anesthetic.

1 35. The method of claim 33 wherein the drug is propofol.

1 36. The method of claim 11, wherein the sampled gas is xenon.

1 37. An apparatus that delivers inspired gas to a person comprising: a) an
2 inspired gas delivery device; b) at least one respiratory site sampling device
3 which samples the pressure at at least one respiratory site; c) and wherein the
4 respiratory site sampling device is connected to a pressure analyzer which
5 determines the phase of the person's respiration cycle; d) and wherein the
6 inspired gas delivery device is connected to a controller that modulates the flow
7 of inspired gas in accordance with the phase of the person's respiratory cycle.

1 38. The apparatus of claim 37, wherein the respiratory site sampling device
2 comprises at least one nasal sampling device which samples the pressure in the
3 person's nasal airway and an oral sampling device which samples the pressure in
4 the person's oral airway.

1 39. The apparatus of claim 37, wherein the controller delivers a higher flow of
2 inspired gas during the inhalation phase of the person's respiratory cycle.

1 40. The apparatus of claim 38, wherein at least two of the nasal and oral
2 sampling devices are connected to a pressure comparator which determines the
3 person's primary respiratory site.

1 41. The apparatus of claim 37 also comprising a gas sampling device.

1 42. The apparatus of claim 41, wherein the gas sampling device is a
2 capnometer.

1 43. The apparatus of claim 41, wherein the gas sampling device comprises a
2 nasal gas sampling device and an oral gas sampling device and wherein the
3 controller selects at least the gas stream from the primary respiratory site for
4 monitoring.

1 44. The apparatus of claim 43, wherein the oral and nasal gas sampling
2 devices are capnometers.

1 45. The apparatus of claim 37 also comprising a flow control valve and
2 wherein the controller runs software that indicates an error to a user if while the
3 flow control valve is open, the controller detects pressure at the source of
4 inspired gas but fails to detect pressure downstream of the flow control valve.

1 46. The apparatus of claim 37 also comprising an auditory breath sonification
2 device that amplifies breath sounds.

1 47. The apparatus of claim 46, wherein the auditory breath sonification device
2 is a microphone that amplifies actual breath sounds.

1 48. The apparatus of claim 46, wherein the auditory breath sonification device
2 comprises a white noise generator that provides simulated breath sounds.

1 49. The apparatus of claim 48, wherein said simulated breath sounds
2 distinguish between inhalation and exhalation breath sounds.

1 50. The apparatus of claim 41, wherein the gas sampling device samples CO₂
2 gas.

1 51. The apparatus of claim 41, wherein the gas sampling device samples
2 xenon gas.

1 52. The apparatus of claim 41, wherein the gas sampled is a drug.

1 53. The apparatus of claim 52, wherein the drug is an intravenous anesthetic.

1 54. The apparatus of claim 52, wherein the drug is propofol.

1 55. The apparatus of claim 37, wherein the inspired gas delivery device
2 comprises a diffuser.

1 56. The apparatus of claim 37, wherein the controller reduces the flow of
2 inspired gas during the exhalation phase.

1 57. A method for delivering an inspired gas, the method comprising the steps
2 of: a) determining the breath phase; b) delivering a higher flow of inspired gas
3 during the inhalation phase; and c) monitoring gases in the breath gas stream.

1 58. The method of claim 57 also comprising the step of determining at least
2 one of the breath rate and inspiratory/expiratory time ratio.

1 59. The method of claim 57, wherein the step of determining at least one of
2 the breath phase, breath rate and inspiratory/expiratory time ratio is
3 accomplished by analyzing the pressure waveform at at least one respiratory
4 site.

1 60. The method of claim 57, wherein the step of determining at least one of
2 the breath phase, breath rate and inspiratory/expiratory time ratio is
3 accomplished by monitoring the humidity at at least one respiratory site.

1 61. The method of claim 57, wherein the step of determining at least one of
2 the breath phase, breath rate and inspiratory/expiratory time ratio is
3 accomplished by monitoring the temperature at at least one respiratory site.

1 62. The method of claim 57 also comprising the step of reducing the flow of
2 inspired gas during the exhalation phase.

1 63. The method of claim 57, wherein the monitoring of exhaled gas is
2 performed during a period of low gas flow in the exhalation phase.

1 64. The apparatus of claim 37 also comprising a plurality of lumens which
2 effect one or more of delivering of inspired gas, respiratory site sampling and gas
3 sampling and wherein said lumens are affixed to one another along separable
4 tear lines.

1 65. The apparatus of claim 64, wherein the lumen that accommodates the flow
2 of inspired gas is of larger circumference than the other lumens.

1 66. An apparatus according to claim 64 wherein one of said lumens is a
2 stimulus channel that carries an auditory prompt to the person.

1 67. A pneumatic harness for a medical device comprising a plurality of lumens
2 grouped in one or more clusters, said clusters being manually separable from one
3 another.

1 68. The pneumatic harness of claim 67, wherein the harness also comprises
2 tear lines to permit separation of the lumens from one another.

1 69. The pneumatic harness of claim 67, wherein at least one of the lumens is
2 larger than the other lumens.

1 70. The pneumatic harness of claim 67, wherein the cross section of each
2 cluster is of aerofoil shape.

1 71. The pneumatic harness of claim 67 also comprising a connector that
2 permits delivery of supplemental oxygen from standard medical oxygen
3 connectors using an oronasal piece.

1 72. The pneumatic harness of claim 67 also comprising an adapter that
2 connects the pneumatic harness to a medical device.

1 73. A method of determining which of the two nares is less obstructed, said
2 method comprising the steps of: a) sampling the pressure in the gas stream of
3 each nare; b) comparing the pressure variations in the gas stream within each
4 nare; c) comparing the extent of variation of said pressures as between the nares;
5 and d) selecting the nare with the larger pressure variation as the nare that is
6 less obstructed.

1 74. The method of claim 73, wherein the nare that is less obstructed is
2 selected to receive inspired gas.

1 75. The method of claim 73, wherein the nare that is less obstructed is
2 selected for gas sampling.

1 76. The method of claim 73, wherein the nare that is less obstructed is
2 selected for pressure sampling.

1 77. The method of claim 73, wherein the nare that is less obstructed is
2 selected for determination of respiration phase.

1 78. The method of claim 73, wherein the nare that is less obstructed is
2 selected for determination of respiration rate.

1 79. The method of claim 73, wherein the nare that is less obstructed is
2 selected for determination of inhalatory/expiratory time ratio.